

What is claimed is:

1. A device for treating an eye, comprising:  
a piercing member having a length and an outer diameter, the piercing member having proximal end and a distal end and a lumen extending therebetween, the distal end being of sufficient sharpness to penetrate an insertion site of the device; and  
a cannula slidably insertable within the piercing member, the cannula having a length longer than the length of the piercing member and having a distal end of sufficient sharpness to penetrate a treatment site,  
wherein the outer diameter of the piercing member is small enough to allow for self-sealing of the insertion site upon removal of the piercing member from the insertion site.
2. A device for treating an eye, comprising a piercing member and a cannula insertable within the piercing member, the cannula having a length longer than the length of the piercing member.
3. The device of claim 1 or 2 further comprising:  
a handle having a length, a proximal end and a distal end and a lumen extending therebetween, the distal end of the handle being mounted to the piercing member, and the handle lumen being sized to accommodate the cannula.
4. The device of any one of claims 1 through 3 wherein the distal end of the piercing member is beveled.
5. The device of any one of claims 1 through 4 wherein the outer diameter of the piercing member is about 25 gage.
6. The device of any one of claims 1 or 3 through 5 wherein the length of the piercing member is in the range of about 6 millimeters to 40 millimeters, the length of the cannula is in the range of about 35 millimeters to 75 millimeters, and the

length of the reduced diameter distal portion of the cannula is in the range of about 1 millimeter to 3 millimeters.

7. The device of any one of claims 1 through 6 wherein the piercing member is made of a stainless steel.

8. The device of any one of claims 1 through 7 wherein the cannula is made of polyimide tubing.

9. The device of any one of claims 1 through 8 wherein the device is adapted for subretinal delivery of a therapeutic agent to a patient's eye.

10. A device for treating an eye, comprising:

a piercing member having a length and an outer diameter, the piercing member having proximal end and a distal end and a lumen extending therebetween, the distal end being of sufficient sharpness to penetrate an insertion site of the device;

a rigid member disposed within the piercing member lumen and having a proximal end and a distal end and a lumen extending therebetween, the rigid member having a length greater than the length of the piercing member;

a cannula disposed within and connected to rigid member lumen, the cannula having a length longer than the length of each of the piercing member and the rigid member, and having a distal end of sufficient sharpness to penetrate a treatment site.

11. The device of claim 10 further comprising:

a quantity of tubing having a proximal end and a distal end and a lumen extending therebetween, wherein the proximal end of the rigid member is disposed within and connected to the distal end of the tubing.

12. The device of claim 11 further comprising:

a first connection element having a proximal end and a distal end and a lumen extending therebetween, the distal end of the first connection element being connected to the proximal end of the piercing element.

13. The device of claim 12 wherein the first connection element lumen and the piercing member lumen are substantially longitudinally aligned.

14. The device of claim 12 further comprising:  
a seal in communication with the first connection element such that the seal substantially surrounds at least a portion of the first connection element lumen.

15. The device of any one of claims 10 through 14 wherein the outer diameter of the piercing member is small enough to allow for self-sealing of the insertion site upon removal of the piercing member from the insertion site.

16. The device of any one of claims 10 through 14 wherein the distal end of the piercing member is beveled.

17. A device for treating an eye, comprising:  
a piercing member having a length and an outer diameter, the piercing member having proximal end and a distal end and a lumen extending therebetween, the distal end being of sufficient sharpness to penetrate an insertion site of the device;  
a handle having a length, a proximal end and a distal end and a substantially hollow portion, the distal end of the handle being mounted to the piercing member, and the handle lumen being sized to accommodate the outer diameter of the cannula;  
a quantity of tubing having a proximal end and a distal end and a lumen extending therebetween, the distal end of the tubing being disposed within the substantially hollow portion of the handle; and  
a cannula connected to, and disposed at least partially within the tubing lumen, the cannula having an outer diameter such that the cannula is substantially flush with the tubing lumen, and having a distal end of sufficient sharpness to penetrate a treatment site.

18. The device of claim 17 further comprising:

a housing located within the substantially hollow portion of the handle, the housing being in communication with the distal end of the tubing; and

an actuating element in communication with the housing, wherein distal-to-proximal and proximal-to-distal movement of the actuating element are effective to impart corresponding movement to the housing and the tubing.

19. The device of claim 17 or 18 wherein the distal end of the piercing member is beveled.

20. The device of any one of claims 17 through 19 wherein the outer diameter of the piercing member is small enough to allow for self-sealing of the insertion site upon removal of the piercing member from the insertion site.

21. A medical device kit comprising one or more of the devices of any one of claims 1 through 20.

22. The kit of claim 21 wherein one or more of the device are packaged in sterile condition.

23. A method for treating an eye comprising:  
inserting into an eye a device comprising a piercing member and a cannula insertable within the piercing member, the cannula having a length longer than the length of the piercing member.

24. The method of claim 23 wherein a therapeutic agent is administered to a patient's eye through the device.

25. The method of claim 23 wherein the therapeutic agent is administered subretinally to the patient's eye.

26. The method of any one of claims 23 through 25 wherein the maximum cross-sectional dimension of the portion of the device that pierces a patient's eye is about 25 gage or smaller.

27. A method of treating an eye, comprising:  
inserting a piercing member having an outer diameter into an insertion site, the piercing member having a proximal end and a distal end and a lumen defined therebetween;

advancing a cannula through the piercing member lumen, the cannula having a proximal end and a distal end;

guiding the cannula to a treatment site;

treating the treatment site;

withdrawing the cannula from the piercing member; and

withdrawing the piercing member from the insertion site, wherein the outer diameter of the piercing member is small enough to allow the insertion site to self-seal following withdrawal of the piercing member.

28. The method of claim 27 wherein the step of guiding the cannula to the treatment site comprises:

advancing the cannula within the eye until the distal end of the cannula is within the treatment site.

29. The method of claim 27 or 28 wherein the step of treating the treatment site comprises:

supplying a medicament through the cannula and into the treatment site via the distal end of the cannula.

30. The method of any one of claims 27 through 29 wherein the medicament is selected from the group consisting of genes, proteins, cells, small molecule pharmaceuticals and sterile solutions.

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31. The method of any one of claims 27 through 30 wherein the step of treating the treatment site comprises withdrawing material from the treatment site into the distal end of the cannula.

32. The method of any one of claims 27 through 31 wherein the step of inserting the piercing member into the insertion site comprises inserting the distal end of the piercing member into and through the eye's sclera.

33. The method of any one of claims 27 through 32 wherein the treatment site is selected from the group consisting of the eye's retina and the eye's vitreous humor.

34. The method of any one of claims 27 through 33 wherein the treatment site is the eye's retina and the step of treating the treatment site comprises:

injecting medicament through the cannula and into the retina such that a dome-shaped retinal detachment is formed.

35. The method of any one of claims 27 through 34 wherein the outer diameter of the piercing member is about 25 gage or smaller.